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Nurses and Higher Education: The Costs of Change

by

LEIGH GOODWIN

NICK BOSANQUET, *University of York*

February 1986

DISCUSSION PAPER 13

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Leigh Goodwin and Nick Bosanquet

The Authors

Leigh Goodwin is employed by HAY-MSL Management Consultants, London. Nick Bosanquet is a Senior Research Fellow at the Centre for Health Economics, University of York.

Acknowledgements

This paper was the outcome of a two month period of research carried out at the Centre for Health Economics on behalf of the Royal College of Nursing's Commission on Education. The two authors would like to acknowledge the active assistance they received from colleagues Professor Alan Maynard and Dr Keith Hartley. They would also like to thank the Baroness Professor Jean MacFarlane, Cynthia Stevenson and Jennifer Wilson-Barnett for the time and information they all provided upon visits to their departments during the course of the study. We are grateful to the Royal College of Nursing for financial support in publishing this paper.

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CONTENTS

ABSTRACT

- SECTION I : Introduction
- SECTION II : Data: Sources and Problems
- SECTION III : Formal Costs of RN Training Under Alternative Systems
1. Direct Teaching Costs
 2. Costs of Student Maintenance Allowances
- SECTION IV : Informal Costs of RN Training Under Alternative Systems
- SECTION V : Replacement Costs of RN Training Under Alternative Systems
- SECTION VI : Central estimates of Overall Exchequer Costs of RN Training Under Alternative Systems
1. Costs per Registered Nurse
 2. Annual Aggregate Recurrent Costs
- SECTION VII : Discussion

REFERENCES

ABSTRACT

This paper presents estimates for the costs of training Registered Nurses (RNs) by Degree Courses (4-year courses, based in Universities or Polytechnics) and Diploma Courses (3-year courses, based in Polytechnics and Colleges of Further Education), to be compared with estimates for the corresponding costs under the existing system (3-year courses, based in District Health Authority Schools of Nursing).

The costs of RN training are sub-divided into three components :

(a) Formal Costs which we take to consist of expenditures by the state on both the direct teaching costs of student nurses as well as the cost of their maintenance allowances;

(b) Informal Costs which are the real manpower resource costs incurred due to the teaching contribution of ward staff not directly paid to teach; and

(c) Replacement Costs which are a measure of the (benefits) value of the work contribution of student nurses and of the cost of replacing them.

The main results of this study are as follows (all costs for England in 1982/83 prices) :

(a) The estimated cost of training a RN under the School of Nursing system is about £8,750 over their three year training period (£21,050 net of replacement cost of £12,300).

(b) The estimated cost of training a RN via Degree Courses is about £17,350 over their four year training period (£23,500 net of replacement cost of £6,150).

(c) The estimated cost of training a RN in Diploma Courses is about £10,250 over their three year training period (£14,350 net of replacement cost of £4,100). If such RNs proceed onto one year Degree Conversion courses, their overall costs rise to about £13,800 (£19,950 net of replacement cost of £6,150).

We also present detailed estimates for the annual aggregate costs under the alternative systems. With a current intake level of 17-18,000 student nurses in England, the net cost of the current system is estimated to be £122.5 million at 1982/83 prices, or £8.75 million per 1,000 qualified RNs. Assuming the same target number of qualifiers, the corresponding cost of the proposed system is £154.5 million, or around £11 million per 1,000 qualified RNs.

Hence, overall annual aggregate recurrent costs of RN training will rise by about £32 million (26%) following transition from the present to the proposed system should the required number of newly qualified RNs per year remain at the current level of about 14,000 (in England). Obviously, should this target number decrease, annual aggregate recurrent costs will decline accordingly. Furthermore, minor changes in the work contribution of Diploma Course students and a reduction in the number of students taking Diploma-Degree Conversion Courses would save up to £13 million per year under the proposed system.

Though Enrolled Nurses (ENs) would not be trained under the proposed system and this report sets out to compare only the costs of RN training under the alternative systems, it should be noted that considerable costs are being incurred under the present system for EN training. It is estimated to cost around £4,000 to train an EN successfully. Given the annual intake of around 7,000 Pupil Nurses in England and so a 'target' number of newly qualified ENs of 5-6,000 per year, annual aggregate recurrent costs of EN training in England are estimated to be about £22 million (1982/83 prices).

The estimated annual recurrent value of the productive contribution of Student Nurses (i.e. replacement costs) will have fallen by just under £110 million. We estimate DHAs in England will require around 21,000 additional ward staff (which we assume will be an even mix of Nursing Auxiliaries and Enrolled Nurses) to replace this reduced contribution. This is an increase in the total stock of nursing and midwifery staff of around 5%.

The most important areas of uncertainty for the overall central estimates of the costs of RN training under the proposed system are the level and source of student bursaries and the value of the work contribution of students in the clinical area.

SECTION I

Introduction

The Royal College of Nursing has set out a number of clear and far reaching proposals for an alternative system of Registered Nurse (RN) training in the UK. The essence of these proposals involves a change in 'learner status' from the present 'employee status' system under which Student Nurses are employees of their District Health Authority (DHA) and attached to the local School of Nursing - to a 'student status' system entailing a movement of nurse training away from the Schools of Nursing and into institutions of higher education, with students no longer DHA employees but in receipt of central Government 'bursaries' (maintenance allowances).

The purpose of this paper is to provide some forecasts of the recurrent costs of Registered Nurse training under the proposed system to compare with estimates of the corresponding costs under the present system. We also provide estimates for the unit and annual aggregate recurrent costs of Enrolled Nurse (EN) training, although no comparative estimates for the proposed system are presented since such training is to be discontinued.

Under the RCN's proposed system, the DHSS and Health Authorities will decide on the total numbers to be trained and the financial level of bursaries, whilst the statutory bodies will decide where students are to be trained and will accredit and oversee the institutions in which education will take place. The Department of Education and Science (DES) will carry out, and have responsibility for, education and training, and will attempt to integrate this education within the higher education system as a whole. Students will continue to receive bursaries and teaching from University/Polytechnic staff whilst in the clinical area, rather than become employees of the DHAs (as is the case with some Degree Courses at present).

Under the proposed system, around 5% of students will undertake 4-year Degree Courses in Universities or Polytechnics. One might assume that these courses, in terms of content and cost, will remain very much as is presently the case for existing Degree Courses. Intake on these courses in 1984 was around 400, which represents just under

2% of the (estimated) total intake of Student Nurses in Great Britain in that year i.e. approximately 22,000. The remaining 98% of students enlist on 3-year Diploma Courses, although it is expected that between 10% and 15% might progress onto a one-year Degree Conversion Course upon attaining the Diploma (presumably depending upon standard of pass in Diploma examination/assessment). Diploma courses will be validated by the CNAA (by Universities in Northern Ireland) and will be based in Polytechnics and Colleges of Higher Education.

There would obviously be costs to any changeover. Staff would have to be retrained. In the short term there might be some spare capacity within Polytechnics and Universities, however, additional capital expenditure would certainly be needed for the full programme.

The option of employing the premises and capital equipment of existing Schools of Nursing - currently at the disposition of DHAs - for use in teaching could be explored in detail. This may prove to be necessary in those Districts with no (or limited) local University, Polytechnic or College of Higher Education facilities readily available. We must also recognise that because of the limited mobility of trained staff, certain Districts may face manpower shortages (in the short term at least) as a result of their need to 'replace' the productive contribution School of Nursing students currently provide - both because productive contributions per student will be reduced (see Section V) and because the shift of students into institutions of higher education will involve a redistribution of students between the Districts in which they are to obtain their clinical experience.

Of course, should the staff:student ratios associated with Diploma Courses be reduced from the level currently found in Schools of Nursing (just under 1:17 in 1984) then there will be some once-and-for-all costs for the changeover in training the extra staff, in addition to greater 'formal costs' (see Section III, part 1, below) once achieved. However, such 'changeover costs' whilst obviously of significance to the practicality of an immediate and complete transfer in nurse training from the current to the proposed system, are not dealt with in detail in this report. This report attempts to predict the recurrent costs of nurse education following a successful transition from the current to the proposed system.

We do not assess the relative 'quality' or 'output' of RNs trained under the alternative systems. However, there seems to be a consensus of opinion suggesting that the proposed system, by being geared to a greater extent towards the educational needs of the students and to a lesser extent towards the day-to-day manpower requirements of DHAs, would provide a 'better' all-round education and training in ward management (and nursing generally) than exists at present. The greater level of satisfaction Student Nurses would feel under the proposed system might lead to a reduction in the wastage rate during training (and so a reduction in the cost of training a RN). The present combined drop-out plus failure rate (allowing for successful retakes) is about 20% (made up of 10% wastage during the course and 10% examination/assessment failure) according to recent Institute of Manpower Studies estimates. From what is known about the wastage from current Degree Courses, wastage might fall to about 10% overall.

As a result of the adoption of the RCN's proposals on basic nurse training, along with other proposals relating to refresher courses (for re-entrants) and Conversion courses (for Enrolled Nurses), the annual number of entrants required to meet the NHS's nurse manpower targets ('demand') will be substantially reduced. This would improve further the chances of a reduction in wastage. Current wastage rates of qualified RNs (according to data from those Regions such as South West Thames and Trent which have more sophisticated manpower information systems) are around 15% per annum. This figure might be reduced to about 10%. Allowing for some expansion in the WTE total qualified nursing workforce at a rate of about 1.0 per cent per annum, the annual intake of entrants in England may well fall considerably from the 1982 level of around 17,200. This will obviously affect the aggregate annual costs of training the NHS's nurse manpower requirements. It will also alter the qualified: trainee:unqualified ratio of staff in nursing establishments/wards from the 62%:10%:27% found at present with the qualified percentage rising and the trainee percentage declining. Possible changes in wastage rates might, in the long term, make the new system more cost-effective. However, these rates will not have much impact on budgetary costs in the first five years or more.

In this study we concentrate on three main costs. These are :

- (a) the formal costs of training which can be divided between resource costs such as staffing and equipment and the costs of salaries/maintenance allowances paid to students.
- (b) the informal costs of tuition provided by staff not directly paid to teach. Ward Sisters (and other grades of ward staff) are involved in teaching Student Nurses whilst in the clinical area.
- (c) the replacement costs of paid staff time required as a substitute for the contribution of student labour. This is a rough measure of the value of the work contribution made by trainees.

Section II outlines some of the problems encountered in the estimation of these costs. These problems arise largely because the quality of the data is less than ideal.

Sections III, IV and V then deal with the estimates of the costs incurred by School of Nursing, Degree Course and Diploma Course students under the three headings given above. These separate components are assimilated to produce estimates for the overall cost of training/educating RNs under the different systems in Section VI. We also estimate the annual aggregate recurrent costs of nurse training/education under the present and proposed systems.

Finally, Section VI presents a brief discussion of our estimates, the uncertainties involved and the cost implications of certain detailed aspects of the proposed system during and following its introduction.

SECTION II

Data: Sources and Problems

Inevitably assumptions have to be made about costs now and their changes in the future. We have tried to spell out clearly the sensitivity of the results to changes in assumptions. Because of shortcomings in the data and uncertainties over the most appropriate assumptions on which to base calculations, most of the estimates presented are rounded to avoid the impression of spurious accuracy.

There are particular difficulties in estimation of the 'formal costs' of Degree Course and Diploma Course students for small departments such as Nursing Studies. Data are available, or can be estimated, for the average annual recurrent costs per student in Universities and Polytechnics, but these 'averages' mask considerable differences between disciplines and departments. Clinical sciences generally have the highest recurrent costs per student, followed by natural sciences and engineering, and finally arts, humanities and social sciences. In addition, 'average' figures do not distinguish between undergraduate and postgraduate students (the latter generally have higher annual recurrent per student costs). In fact, the 'average' figures presented simply represent total (capital plus current) net expenditure by all Universities and Polytechnics in Great Britain, divided by the total (WIE) number of students (home and overseas, undergraduate and postgraduate) in these institutions in the year in question. Undergraduate degree courses in nursing do not fit easily into this spectrum since inputs from a range of disciplines and departments across the spectrum are involved, besides the fact that students on these courses spend a considerable proportion of their time outside the University of Polytechnic and in the clinical area. To assist us in making our estimates we have collected data on costs by visiting a number of different Universities and Polytechnics.

Turning to the formal costs of nursing Diploma Course students, there are no specific data since no such courses exist at present. It can be assumed that such students will be based in Polytechnics and Colleges of Higher Education, and so we might take the 'average' annual recurrent costs per Polytechnic student as a starting point. This is lower than the corresponding cost per University student - when calculating formal costs of Degree Courses nurses we assume a 50-50 split in numbers between Universities and Polytechnics and so take the mid-point in costs between

University and Polytechnic recurrent costs per student. But much will then depend upon the staff : student ratio used for Diploma Courses, and this is undecided. Our estimates will provide some idea as to just how the costs of Diploma Course students - and the total aggregate annual costs of nurse training/education under the proposed system - will vary with the ratio decided upon or aimed for.

As will be seen in the preceding sections, such shortcomings of 'hard' data and uncertainty do affect final estimates. The same is true of other data embodied within our estimates and which are of particular significance to the estimation of informal costs and 'replacement' costs. These have to be mainly based on the views collected from nurse managers at regional and district level, representatives of statutory and professional bodies concerned with nursing and individuals intimately involved with Degree Courses.^[1]

The other source of such data was existing studies in the relevant areas of discussion. Much of the work on costs of nurse training under the School of Nursing system is taken from the Centre for Health Economics (CHE) Discussion Paper on the Exchequer Costs of Registered and Enrolled Nurse Training over the past 20 years.^[2] The authors of this CHE Discussion Paper, Goodwin and Hartley, estimated costs incurred during the hospital year 1982-83 (along with two earlier years) : the most recent year for which much of the requisite data are available. Estimates thus derived are employed as a starting point for the estimates of this report for the current costs of School of Nursing system training - these will be expressed in terms off 1982/83 prices (as will costs under the proposed system).

As a result of the uncertainty surrounding both types of data, as well as the choice of appropriate methodology and assumptions employed to generate final estimates, some 'sensitivity analysis' is presented where it is thought that this may illuminate the degree to which 'central' estimates may vary with changes in these data and assumptions. As will be seen, the areas of uncertainty to which 'central' estimates are particularly sensitive are the precise magnitude of the 'formal costs' of Diploma Course students which, it is argued, will depend much upon the staff : student ratio on such courses, and the assessment of the productive contribution of all three types of student - School of Nursing, Degree Course and Diploma Course. Naturally, least of all is known about the third type.

Footnotes to Section II :

- (1) To arrive at these estimates visits were made : to Leeds Polytechnic (Cynthia Stevenson), Manchester University (The Baroness, Professor J Macfarlane), and Chelsea College (Jenifer Wilson-Barnett). Contact was also made with Edinburgh University (Professor Penny Prophet) and Hull University (Professor Margaret Clarke) who forwarded the relevant details by post. We would like to acknowledge the help given.
- (2) K Hartley and L Goodwin 'The Exchequer Costs of Nurse Training', Centre for Health Economics, University of York, 1985.

SECTION III

The Formal Costs of RN Training under Alternative Systems

The formal costs of RN training can be sub-divided into two components. These are the direct teaching costs of the institutions undertaking nurse training/education and the costs of the salaries (allowances) paid to students during their period of training/education. We refer to these two types of costs as 'formal' because they involve actual (tangible) expenditures of the State or public sector. However, many of these expenditures are not fully recorded and/or are 'joint costs' which are not routinely divided into those registered specifically in the teaching of student nurses, and those incurred for other reasons (e.g. in the teaching of non-nursing students, or in the general running of a hospital).

1. Direct Teaching Costs

(a) School of Nursing Students

In the case of Schools of Nursing, these costs are primarily the expenditures of the ENB, as recorded in the old GNC Annual Report and Accounts and financed by the DHSS. The most sizeable items in these accounts are the salaries of Nurse Tutors and Clinical Teachers, along with their administrative, secretarial and support staff: plus the costs of teaching equipment and so on. The figure for England in 1982/83, covering expenditure on the training of all years, grades and specialisms of trainees, was approximately £57,400,000.

The total number of such trainees in England in 1982/83 was around 72,500 (not including Degree Course students). However, it is likely that formal costs per year of Student Nurses exceeds that of Pupil Nurses due to the higher proportion of their course that students spend 'in class'. In fact, in 1975/76, a year in which there were 54,625 Student and 21,264 Pupil Nurses training in England, the GNC estimated that around three-quarters of its reported expenditure went on Students and a quarter on Pupils. This suggests that direct teaching costs per year of RN training exceeds the corresponding costs per year of EN training by around 16.8%. Translating such figures into 1982/83 expenditure and numbers, Hartley and Goodwin (1985) estimated direct teaching costs per Student Nurse during the 1982/83 year were approximately £830.^[1]

Since 1982/83 however, the direct teaching costs of School of Nursing Students are likely to have risen in real terms largely as a result of a declining trend in the number of entrants over the past few years - the staff:student ratio has decreased, and is now between 1:16 and 1:17 (having been around 1:18 in 1982/83). If it is assumed that 'direct teaching costs' per student, per year under the School of Nursing system will vary, in real terms, with this ratio, then a fairer estimate of current (1984/85) 'direct teaching costs' is approximately £900 (in 1982/83 prices) per School of Nursing Student per year.

To this figure we also add an estimate of 'hidden' teaching costs. These are actual expenditure/costs incurred but which are not met by the GNC/ENB and, therefore, not presented in their Accounts. Basically, they are the costs of running and maintaining (heating, lighting, telephone etc) the 182 Schools of Nursing in England which fall upon the DHA budgets rather than the ENB budget. On the basis of a small sample of Schools, Bendall (1983) estimated these costs to be approximately £200 "per qualifier" in 1982/83 - which, since there were around 23,400 qualifiers (all specialisms and grades) in England in 1982/83, amounts to a total of £4,680,000. If we add to this the administrative costs charged to the DHAs by the ENB for keeping trainee records (an 'index fee') and for running the final exams (estimated by John Greenwood at the RCN to be £51.50 per qualifier: a total of £1,204,100 in 1982/83), then DHA 'hidden' costs sum to £5,855,100. This works out at roughly £80 per trainee per annum in 1982/83.

It is worth noting though that this figure almost certainly under-estimates the true extent of DHA costs since no allowance is made for the 'opportunity costs' incurred in the use of existing School of Nursing premises and capital. Buildings and capital could be put to alternative use, or simply rented out in some locations. Furthermore, there is no assessment of the value of rent abatements received by resident trainees. However, both of these types of costs exist in the higher education sector and would apply to Degree and Diploma Course students. By excluding them, we implicitly assume that they are of similar magnitude under both systems.

Taken together, the direct teaching costs of School of Nursing Students are therefore £980 per student per year (1982/83 prices).

(b) Degree Course Students

The equivalent 'direct teaching costs' in the case of Degree Course Students are the cost/expenditures of Universities and Polytechnics, as met by the DES. Unfortunately, such costs are not recorded systematically and reported as with the GNC Annual Report and Accounts, and even if they were, there would remain the problem of identifying the components flowing specifically from degree courses in Nursing or Nursing Studies.

The most satisfactory method of estimating the direct teaching costs of Degree Course Student Nurses is not at all obvious. A rough approximation of direct teaching costs under Degree Courses is gleaned from a comparison of staff:student ratios with those prevalent in Schools of Nursing. The justification for such an approach is that teachers' salaries were the largest item of the ENB/GNC annual expenditure and are a major item of University and Polytechnic expenditure. Many other items in the Accounts of both the ENB/GNC and Universities/Polytechnics are variable and are certain to depend upon the number of teachers in post, since for each teacher, there will be associated overheads - secretarial, administrative, equipment etc.

Calculating staff:student ratios in the case of Degree Course Students is complicated by the fact that it is typically not just Lecturers in Nursing Studies who are involved in teaching, but also Lecturers from the University's or Polytechnic's various departments of behavioural and natural science. On the basis of our visits to Degree Courses in nursing, we estimate that - taking into account non-nursing staff inputs - the average (full time equivalent) staff:student ratio is around 1:9, or approximately double the 1982/83 estimate for the Schools of Nursing.

This would imply that teaching input per Degree Course Student per year was about twice the 1982/83 level for Student Nurses in the School of Nursing system. However, we must also take account of the fact that Lecturers in Universities and Polytechnics are typically in receipt of considerably greater salaries than are Nurse Tutors and Clinical Teachers in Schools of Nursing. In fact, evidence from the New Earnings Survey 1983 and DHSS (November 1983) ^[2] suggests that University and Polytechnic staff can earn approximately 40-50% more than Nurse Tutors.

Of course, the fact that University/Polytechnic Lecturers are paid more than Nurse Tutors does not necessarily mean that related administrative, secretarial, equipment costs etc are also greater in the case of Degree Course Students. However, such 'overheads per teacher' are probably higher in Universities and Polytechnics for a variety of reasons (e.g. more spacious offices, computer terminals, pleasant campus grounds, student and staff sports facilities etc).

One further point on the issue of comparison is that Lecturers in Universities and Polytechnics devote a significant proportion of their time to research. This is not the case with the vast majority of Nurse Tutors. In fact, Lecturers on Degree Courses in Nursing generally have (officially, at least) one day per week set aside for research. The annual cost of a Degree Course Student should be increased by 20% to make allowance for this additional distinction between the two systems. It implies, in other words, that the 'true' staff:student ratio is around 1:11 rather than 1:9, once allowance is made for Lecturers' research time.

Doubling the £910 per year figure estimated for the direct (plus 'hidden') teaching costs of School of Nursing Students incurred in 1982/83 to allow for differences in staff:student ratios and augmenting the Degree Course costs by 45% (to take account of higher salary and overhead costs per teacher) and a further 20% (in acknowledgement of the time Lecturers devote to research) would lead to an estimate of the 'direct teaching costs' per Degree Course Student per year of approximately £3,150.

This estimate, in fact, falls generally into line with overall annual course fees (tuition fees, examination fees, registration fees etc) charged for non-EEC students taking Degree Courses in Nursing in England in 1982/83. On the other hand, it would appear to fall below estimates for the direct teaching costs of Degree Course Students that might be drawn from data on the average annual recurrent cost per University and Polytechnic student. According to H.M. Treasury^[3] figures, estimated total current plus capital expenditure by Universities in Great Britain during the financial/hospital year 1982/83 was in the order of £137 million. University Grants Committee statistics^[4] indicate that the total number of students (full-time and sandwich, postgraduate and undergraduate, home and overseas) in Universities in Great Britain was around 300,000 in the academic year 1981-82; and 295,000 during the academic year 1982-83 - which suggests a figure of

about 297,500 for the financial year 1982-83. Together these data indicate a figure for the average annual recurrent cost per University student in 1982/83 of approximately £4,631.

Now, the direct teaching cost of Degree Course Students in 1982/83 is likely to have been substantially less than this average figure for a couple of reasons. To begin with, about half of Degree Course Students are based in Polytechnics rather than Universities. Table 1, which shows average recurrent expenditure per University and (advanced) Polytechnic Student in 1979/80, indicates that such costs in Polytechnics were only about 84% of the University figure. Table 1 also demonstrates that this disparity is due to differences in 'other wages and salaries' and 'other costs' per student - rather than differences in teachers' salaries. (This suggests that staff:student ratios in Universities and Polytechnics are comparable, since teachers in both types of institution are subject to broadly similar salary scales). 'Other salaries' included administration, technicians, secretaries etc., whilst 'other costs' include premises and fixed plant, books and equipment, provisions and other supplies, institutional transport costs and establishment expenses. 'Other salaries' and 'other costs' per student were around 50% higher in Universities than Polytechnics in 1979/80. If the same proportional differential existed in 1982/83 then the average recurrent costs per Polytechnic Student in that year would have been around £3,891. If we assume a 50-50 split of Degree Course Students between Universities and Polytechnics, this suggests an average cost figure of £4,261.

This estimate represents the average over all disciplines. It is known that average annual recurrent costs per clinical and natural science student are perhaps 30-40% higher than per arts, humanities or social science student (due to lower staff:student ratios and greater equipment costs). Though some basic natural science teaching is included within Nursing Degree Courses, it is probable that direct teaching costs per Nursing Degree Course Student approximate closer to those of arts, humanities and social science students, than of clinical and natural science students.

Since the latter types of students make up about 40% of students in Universities and Polytechnics, it is reasonable to reduce the figure of £4,261 by 15% to make allowance for the higher costs of the clinical and natural science students. This provides us with estimates for the direct teaching

Table 1 : Net Recurrent Institutional Expenditures For Full-Time Students
Financial Year 1979-80.

Gross Cost per Student £ (1980 Survey Prices)

Students in	No. of Students (000)[1]	Teachers' Salaries	Other Wages and salaries	Other Costs [2]	Total Gross Costs	Income	Net Cost to Public Funds
Polytechnics ('Advanced Student')	130	1270	610	720	2600	60	2540
Universities	306	1225	900	1075	3200	175	3025

[1] Part-time students are expressed in whole-time equivalents

[2] Expenditure on "Other Costs" includes premises and fixed plant, Books and equivalent, provisions and other supplies, institutional transport costs and establishment expenses.

Source: 'Statistics of Education', 1979, Vol. 5.

cost per nursing Degree Course student in 1982/83 of around £3625 (£3925 in Universities; £3325 in Polytechnics). This is the figure we put forward as our 'central' estimate of these costs, though we recognise the existence of a considerable margin of error - perhaps by as much as $\pm 10-15\%$. The implications for our final central estimates of the costs of RN training under the proposed system of variations of $\pm 10\%$ in our 'central' estimate for the direct teaching costs of Degree and Diploma Course students are discussed in Section VII.

(c) Diploma Course Students

Since Diploma Course students would be based in Polytechnics and Colleges of Higher Education then we might take the estimated figure of £3325 for the average recurrent cost per Polytechnic student in 1982/83 as our starting point in estimating the direct teaching costs of Diploma Course students.

However, it is unlikely that such direct teaching costs will be as high as £3325 (in 1982/83 prices), since this figure is based on staff : student ratios of around 1:9 (the ratio found on Nursing Degree Courses) and the staff : student ratio to be used on Diploma Courses will probably be less than this. In fact, if the staff : student ratio found in Schools of Nursing in 1982/83 (i.e. 1:18) were maintained for Diploma Course students, then direct teaching costs per Diploma course student will only be around 50% of the £3325 average cost per Polytechnic Degree Course student i.e. £1662.5. This is because not only teachers' salaries, but also 'other' salaries and costs (see Table 1) are likely to vary in proportion to the staff : student ratio. Most of these 'other' salaries and costs - particularly in the case of a single department within a Polytechnic - are likely to be variable and depend upon the numbers of teachers involved in the department in question.

It is estimated that the staff : student ratio to be aimed for with regard to Diploma Courses (though this may not necessarily be achieved in practice - at least in the short run - due to manpower and budgetary constraints) will be around half way between the ratios found in Schools of Nursing and on Degree courses. (i.e. around 1:12, or 1:14 allowing for the research input of Diploma Course staff). If this is achieved, it would suggest that the direct teaching cost per Diploma Course student per year will be around £2500 (in 1982/83 prices).

Of course, if the actual ratio on Diploma Courses in practice were to be similar to that found in Schools of Nursing now (say 1:15, or 1:18 taking research into account), Direct Teaching costs for Diploma Course students may only amount at around £2000 p.a. rather than £2500 p.a. But since Diploma course students would experience a considerably greater level of 'classroom' Teaching than School of Nursing students, as well as more teaching from the Polytechnic/College teachers whilst in the clinical area, it is more reasonable to opt for an increased ratio and an estimate of Direct Teaching costs of the order of £2500 per Diploma Course student per year.

2. Cost of Student Maintenance Allowances

(a) School of Nursing students

School of Nursing students are officially employees of their DHA and are in receipt of DHA salaries in the same fashion as unqualified and qualified nurses in post. The relevant costs here, therefore, are what might be termed 'gross salary costs', which amount to the gross salaries received by student nurses plus labour overheads (i.e. employers' national insurance and super-annuation contributions).

To derive the 1982/83 gross salary costs of School of Nursing students, Hartley and Goodwin (1985) calculated the 1982/83 average basic salaries of 1st, 2nd and 3rd year student nurses (£3531, £3680 and £3856, respectively),^[5] adjusted these figures by the 'average' London weighting Allowance (LWA) received by all School of Nursing students in England in 1982/83 (estimated to be £194, and made a 16% allowance for overheads.^[6] Gross salary costs thus derived were:

1st Year Student Nurse	: £4321
2nd Year Student Nurse	: £4494
3rd Year Student Nurse	: £4698

(b) Degree Course Students

Conceptually, it is debatable whether or not the grants/bursaries received by Degree Course students are 'true' costs. Generally speaking, economists regard such grants/bursaries as 'transfer payments', which involve no resource costs, simply a transfer of disposable income from one group in the population to another. On the other hand, the monies required to meet the financial cost of grant/bursaries are likely to be budgetary costs.

As a result of this ambiguity, it is of interest to estimate the impact of estimating alternative magnitudes of maintenance allowance: either zero, or 'full-cost'. The latter is the level of maintenance allowances Degree Course student nurses are to receive. It is thought that these will be (approximately) of the same magnitude as those received by medical students.^[7]

Using data on medical students' awards to estimate the 'average' awards Degree Course students would have been in receipt of over the hospital year 1982/83 is complicated by several facts. Firstly, student awards relate to academic years, which run from the beginning of October rather than April, and so we must take the average of the level of awards in academic years 1981/82. Secondly, there is a Basic Maintenance Allowance to cover the 'Basic' year of 30 weeks and 3 days, plus 'Extra' weekly allowances to be awarded (pro rata) for weeks and days of study over and above the 'Basic' (Degree Courses run for approximately 40 weeks a year). Thirdly, there are three levels of both 'Basic' and 'Extra' allowances relating to students living at home with their parents, living in halls/lodgings in London, and living in halls/lodgings outside London.

Taking the average of the levels of awards over the academic years 1981/82 and 1982/83, and on the basis of the assumption that (as at present) about 15% of Degree Course students would be living in halls/lodgings in London and the other 85% living in halls/lodgings outside London, Degree Course Students would have received (an average) A Basic Allowance of around £1609.6, plus 'Extra' Allowance of £30.2 for the additional 9.4 weeks of their 40 week courses. This provides an estimate for the cost of maintenance allowances of Degree Course students of approximately £1893 per year (in 1982/83 hospital year prices).

A number of Degree Course students might live at home with their parents. If these students were to be eligible only for the lower levels of 'Basic' and 'Extra' Allowances paid to medical students living with their parents, on 'average' level of bursary received by Degree Course students would be lower than the £1893 figure estimated above. For example, if 10% of Degree Course students lived at home with their parents, the 'average' bursary over the 1982/83 hospital year would have been around £1840 i.e. some £53 (2.8%) lower. However, besides simply shifting maintenance costs from the state to students and their parents, what the state had 'taken' with one hand it would partly, at least give

away with the other in the form of increased tax allowances of such parents. For these reasons, and because of the small savings involved, we assume that all Degree Course students are living away from home and in halls/lodgings for the purposes of estimating the costs of maintenance allowances.

(c) Diploma Course Students

The same estimating procedure and discussion on the maintenance allowances of Degree Course students applies equally to Diploma Course students. The only difference is that we assumed that Diploma Course students will be located in the same geographical pattern as are School of Nursing students at present; which implies that approximately 27.6% of Diploma Course students, as opposed to 15% of Degree Course students, would receive the higher maintenance awards received by students living in halls/lodgings in London.

For these reasons, we estimate that had Diploma Course been in existence during the hospital year 1982/83, students on such courses would have been in receipt of, an average, £1939 over that year.

3. Overall Formal Costs

The estimates derived in the discussion in this section are assimilated in Table 2 below.

Table 2 clearly shows that the direct teaching of Degree and Diploma Courses are far in excess of the corresponding costs of School of Nursing Courses. Yet the latter have greater overall formal costs than Diploma Course students and about the same formal costs as Degree Course students. This is because the gross salary costs of student nurses in School of Nursing are in excess of the bursaries paid to students on Degree and Diploma Courses. Naturally, these results depend heavily upon the relative magnitudes of the gross salaries of School of Nursing students and student bursaries.

Table 2 : Central Estimates of the Annual Formal Costs of RN Training
(£) 1982/83 Prices)

Type of Course	Direct Teaching Costs [3]	Costs of Maintenance Allowances	Overall Formal Costs
School of Nursing:			
1st Year	980	4321	5301
2nd Year	980	4494	5474
3rd Year	980	4698	5678
Degree Course (Each Year)	3625	0 ^[1] or 1893 ^[2]	3625 ^[1] or 5518 ^[2]
Diploma Course (Each Year)	2500	0 ^[1] or 1939 ^[2]	2500 ^[1] or 4439 ^[1]

[1] Estimates assume student grants/bursaries are not real costs

[2] Estimates assume student grants/bursaries are real costs. Estimates for Diploma Course students exceed those of Degree Course students because it is assumed that a greater proportion of Diploma Course students will reside in London (about 26.7%) than Degree Course students (15%)

[3] Estimates assume, for simplicity, that direct teaching costs are the same for all years of a course.

From this point onwards 'central' estimates of the formal costs of Degree and Diploma Courses will assume bursaries are to be included among those costs (at a 1982/83 levels of £1893 and £1939 per annum respectively). The discussion in Section VII illustrates the importance of one's view of bursaries as well as their level in real terms.

Footnotes to Section III

- (1) It is assumed for simplicity that in the cases of School of Nursing, Degree Course and Diploma Course students formal costs (and informal costs) are the same for each year of the training/education course.
- (2) DHSS "Background Information for the Review Body for Nursing and Midwifery Staff and Professions allied to Medicine". (November 1983).
- (3) H.M. Treasury, "The Government's Expenditure Plans, 1945-85 to 1986-87". (February 1984).
- (4) University Grants Committee: "A Strategy for Higher Education into the 1990s". (September 1984).
- (5) Salary scales for all grades of nurses, including student nurses, were amended some 21 weeks into the 1982/83 hospital year. 'New' scales come into effect on 23rd August 1982. Figures shown in the text are calculated on the basis of 'old' scales being effective for 21 weeks, and 'new' scales for 31 weeks, of the 1982/83 year.
- (6) 'New' LWA's came into effect on 1st July 1982, some 3 months into the 1982/83 hospital year. The figure of £194 is calculated by dividing the estimated total payment of LWAs to student nurses during 1982/83 by the total number of student nurses in England in that year.
- (7) At present students on some Degree Courses in nursing (e.g. Edinburgh University and Sheffield Polytechnic) receive training allowances from DHAs whilst in the clinical area, rather than student grants/bursaries. Whilst in the clinical area, these students are effectively employees of the DHAs. In many respects, such Degree Courses are a combination of a fully-fledged 'student status' Degree Course system. Since the RCN proposals concern a transition over to a full-fledged student status system, the costs of training RNs under the 'combined' system are not investigated here.

SECTION IV

Informal Costs of RN Training Under Alternative Systems.

(a) School of Nursing Students

Manpower costs are incurred due to the teaching contribution of ward staff working on wards containing trainees. In practice, the quantity (and quality) of teaching and supervision by ward staff will vary considerably with such factors as ward specialism, occupancy rate, staffing level, and so on. Another complication is that all grades of qualified nurse, unqualified and 3rd year trainees typically make some teaching contribution.

Recent studies of teaching in the clinical area - such as that of Norma Reid et al (1983) in Northern Ireland^[1] - suggest that the teaching contribution is ascribed low priority by ward staff and, consequently, at times of staff shortage, little teaching occurs. It must also be borne in mind that costs are incurred only as a result of what might be termed the "pure" teaching contribution of ward staff - we do not include that teaching which occurs during the course of the ward staff's normal duties.

As a result of the uncertainty concerning the actual average level of 'on-the-ward' teaching, Hartley and Goodwin (1985) took three alternative sources of the requisite assumptions to produce 'low', 'central' and 'high' estimates of Informal Costs. The 'low' estimate was derived from Bosanquet and Clifton (1974)^[2] who - on the basis of data from three studies of teaching in the clinical area carried out in the 1960's - concluded that the "most reasonable" assumptions were that two-thirds of Ward Sisters/Charge Nurses (WS/CNs) were involved in teaching and that their average teaching contribution was 5% of their working time. (The contribution of other ward staff was regarded as zero) The 'Central' estimates were based on the results of Reid et al (1984) who found that, on average, WS/CNs spend 2% of their working time teaching and Staff Nurses (SNs) spend 6% of their working time teaching. The 'Upper' estimate was calculated on the basis of the latest opinions of the DHSS and ENB which maintain that, on average, 90% of WS/CNs and SNs are involved and that their teaching contributions are 5% and 7.5% respectively, of their working time.

To produce 'low', 'central' and 'upper' estimates, these alternative sets of assumptions need to be applied to estimates of the total gross salary bills (including labour overheads) of WS/CNs and SNs in England in 1982/83. These estimates are derived, in turn, from estimates of the average gross earning of WS/CNs and SNs in 1982/83 (plus 16% for labour overheads) multiplied by the number of such nurses in posts in hospitals in England in this year. We explicitly exclude from our estimates WS/CNs and SNs working outside hospitals - such as those in the community - since although many of these will have contact with trainees, it is unlikely that any of their teaching will occur outside the normal course of their duties. Trainees are regarded, in principle at least, as supernumerary whilst in non-hospital clinical areas.

On the basis of the figures provided in DHSS (1983), average gross earnings of WS/CNs and SNs (including 16% for overheads) over the 1982/83 hospital year were around £9839 and £7544, respectively. DHSS data indicate that the (WTE) numbers for WS/CNs and SNs in posts in hospitals in England on 30th September 1982 were about 43,344 and 49,929, respectively. If we were to include non-hospital staff, these figures would be 57,021 and 81,277. Combining these data suggest that the gross salary bills of WS/CNs and SNs in hospital post in England for the 1982/83 hospital year were of the order of £426.45m and £376.64m, respectively.

Given these estimates of gross salary, bills, Hartley and Goodwin (1985) produced 'low', 'central' and 'high' estimates of the overall annual Informal Costs (and costs per School of Nursing student) in England in 1982/83 of : £14,215,000 (approximately £195 per student), £31,128,400 (£430 per student) and £44,613,000 (£615 per student), respectively.^[3]

Hence our 'central' estimate for Informal Costs per School of Nursing student per year is £430 (1982/83 prices).

(b) Degree Course Students

No studies have been conducted into the level of Informal Costs of Degree Course students. However, we can reason that such costs are considerably below the £430 per year estimate for School of Nursing students.

To begin with, Degree Course Students spend only about 50-60% of the time which School of Nursing Students spend in the clinical area per year of study.

School of Nursing Students spend as much as 4800 hours in the clinical area over their 3 years of study, whereas Degree course students generally spend somewhere between 3000 hours and 3600 hours spread over 4 years. 3000 is the minimum amount of experience laid down by the ENB.

Furthermore, Degree Course students spend a higher proportion of their clinical experience as (officially, at least) 'supernumerary' to the nursing establishment; such that the actual productive contribution of Degree Course students per year of study is probably only between 40 and 50% of the corresponding figure for School of Nursing students.

This evidence alone might suggest an estimate for Informal Costs per year Degree Course student of around £200 (1982/83 prices). However, such a figure would probably be an overestimate because Degree Course students receive a far greater amount of teaching by their University/Polytechnic lecturers whilst in the clinical area than School of Nursing students receive from their Schools' clinical teachers. Because School of Nursing students receive so little teaching from their clinical teachers whilst in the clinical area they are far more likely to receive - and are far more in need of - teaching and supervision from ward staff. It is also thought that the attitude of ward staff towards the two sets of students with regard to teaching may be quite different.

For these reasons, we estimate Informal Costs per Degree Course student per year to be around £100 (1982/83 prices).

(c) Diploma Course Students

Informal Costs per Diploma Course student per year are assumed to be of a similar magnitude to the Informal Costs per Degree Course student per year i.e. around £100 per year (1982/83 prices).

Footnotes to Section IV

- (1) N.G. Reid, "Summary of Main Findings, Nurse Training Study", Centre for Applied Health Studies, The New University of Ulster, (November 1983).
- (2) N. Bosanquet and R. Clifton "Briggs : The Context", Nursing Times, 1974.
- (3) These estimates for Informal Costs per School of Nursing student assume that annual Informal Costs per student nurse are the same as the corresponding figure per pupil nurse.

SECTION V

Replacement Cost of RN Training Under Alternative Systems

'Replacement' costs are essentially an estimate of the value of the 'output', or productive contribution, of students. As a proxy for the value to DHAs of this contribution, we attempt to calculate the manpower costs DHAs would have to meet to 'replace' students (i.e. compensate for the loss of the productive services students provide in the clinical area) in the absence of those students. To estimate these costs, we need to make assumptions concerning the appropriate grades, and points on the salary scales, of replacement staff; and to multiply the annual gross salary costs of replacement staff by the estimated proportions of their training periods students are actually productive.

This method of estimating the value of the productive contribution of students nurses is not universally accepted. It can be assumed that students' training allowances are an accurate measure of the value of their productive contribution. The former approach would imply that we could simply discount the total cost of maintenance allowances against the value of students' work contribution. The latter approach would involve multiplying the gross costs of students' maintenance allowances by the estimated proportion of their training period they are actually productive members of a nursing establishment to determine the value of their contribution.

However, both of these approaches are based on the rather shaky assumption that the value of student training allowances is an accurate reflection of the value of their contribution. Of course, in one sense, the 'Replacement Cost' methodology implicitly assumes that the gross salary costs of replacement staff accurately measures the value of their contribution. But whilst this is also questionable, it is more likely to be true than is the case for students. Unlike students, replacement staff are productive for 100% of their time.

It is particularly relevant to calculate replacement costs here. The contribution of student nurses would be reduced considerably by any change from the current to the proposed systems of nurse training. Hence, DHAs would be placed in the situation of actually having to 'replace' students in order to maintain their nursing establishments.

(a) School of Nursing Students

As a result of uncertainties surrounding the choice of the most accurate assumptions, Hartley and Goodwin (1985) employed sensitivity analysis in the estimation of 'replacement' costs of School of Nursing Students. In calculating their 'central' estimates, suggested replacements were as follows:

1st Year Student : Nursing Auxiliary (NA)

2nd Year Student : $\frac{1}{2}$ NA + $\frac{1}{2}$ Enrolled Nurse (EN)

3rd Year Student : EN

In deriving their 'central' estimates, Hartley and Goodwin (1985) augmented the mid points on the salary scales of appropriate proportions of the replacement grades (shown in Table 3) by the 'average' London Weighting Allowance received by School of Nursing students in 1982/83 (around £194) and by 16% for overheads.

The 'gross salary costs' of replacement staff were then multiplied by a 'norm' representing the proportion of their training period School of Nursing students are productive members of nursing establishments. On the basis of data relating to training programmes at various School of Nursing in England, this norm was reckoned to be two-thirds - the remaining one-third being spent either on study leave or else as officially supernumerary to the established nursing staff which generally occurs whilst in theatres, in the community, in obstetrics, and on psychiatric wards. Annual leave and sick leave are excluded from these calculations since replacement staff would be equally entitled to these.

'Central' estimates for replacement costs of 1st, 2nd and 3rd year School of Nursing Students are estimated in this manner to have been £3109, £3464, and £3819, respectively in 1982/83. These figures are shown in Table 4 below.

Table 3 : Incremental Points on Salary Scales of Replacement Nurses
(1982/83) 'Average' ^[1] (£p.a.)

Grade	Bottom	Mid	Top
Nursing Auxiliary (NA)	3374	3826	4312
Enrolled Nurse (EN)	4302	4745	5120
Staff Nurse (SN)	4777	5300	5824

[1] Assumes 'old' salary scales were applicable for the first 21 weeks of 1982/83 hospital year. 'New' salary scales came into effect on 23rd August 1982.

(b) Degree Course Students

The same methodology is employed to estimate the replacement costs of Degree Course Students. A similar 'rule-of-thumb' regarding grades or replacement staff to the one embodied in the central estimate of the replacement costs of School of Nursing students discussed above is used:

1st Year Student : NA
2nd Year Student : $\frac{1}{2}$ NA + $\frac{1}{2}$ EN
3rd Year Student : EN
4th Year Student : Staff Nurse (SN)

It is assumed that a 4th Year Degree Course student has the same level of 'productivity'/'competence'/'skill' as the average SN (most probably recently out of School of Nursing training).

To derive 'gross salary costs' of replacement staff for Degree Course students, mid-points on the salary scales of these replacement staff need to be augmented by a sum representing the average LWA replacement staff would be in receipt of, and by 16% for labour overheads such as national insurance.

To estimate 'net replacement' costs of Degree Course students we now need to apply 'norms' relating to the proportions of their 1st, 2nd, 3rd and 4th years such students would have to be replaced in their absence. Analysis of the Degree Course programmes in existence in Universities and Polytechnics reveals that students may spend up to 3600 hours involved in clinical work over their 4 years. However, it is debatable just how 'productive' such students are as they are typically regarded as (officially, at least) supernumerary. This is less the case with those Degree Course students who presently receive DHA training allowances - in fact wages, whilst in the clinical area.

Our enquiries suggested that the 'productive' (i.e. 'non-supernumerary') contributions of 1st, 2nd, 3rd and 4th year Degree Course students are 180 hours, 600 hours, 600 hours and 600 hours, respectively. This total of 1980 'productive' hours in the clinical area, which adds up to between 55% and 65% of the total time spend by Degree Course nurses at various

Universities/Polytechnics in the clinical area, is perhaps a generous estimate. The sensitivity of this assumption is tested below in Section VII.

In other words, since replacement staff (i.e. normal ward staff) work approximately 1800 hours every year, then our 'norms' work out as 10%, 1/3, 1/3 and 1/3 for 1st, 2nd, 3rd and 4th Year Degree Course students, respectively. As is shown in Table 4, this implies that replacement costs for 1st, 2nd, 3rd and 4th Year Degree Course students are: £457, £1700, £1877, and £2092; respectively.

(c) Diploma Course Students

Most of the discussion concerning the estimation of 'replacement costs' of School of Nursing and Degree Course students applies equally to an estimation of the corresponding costs per Diploma Course students.

The RCN proposes that Diploma Courses should run for 3 years. Latest thinking is that the 'productive' (i.e. 'non-supernumerary') contribution of 1st, 2nd and 3rd Year Diploma Course students should be 0, 1/3 and 1/2 respectively of those years. Since Diploma Course students, like Degree Course students, have 40 weeks a year, 40 hours per week, programmes, this implies productive contributions of 0, 533.33 hours and 800 hours, respectively. Hence, 'norms' regarding the proportion of replacement nurses required to replace 1st, 2nd and 3rd year Diploma Course students (in their absence) work out as 0, 29.63% and 44.44%, respectively.

Those Diploma Course students who proceed onto Degree 'conversion' courses based at Universities or Polytechnics make roughly the same productive contribution as 4th Year Degree Course students, i.e. about 600 hours. This would bring their total productive contribution into line with that of the straightforward Degree Course student.

We apply the same 'rule-of-thumb' on grades of replacement staff as used for School of Nursing and Degree Course students. This assumes the same proportion of School of Nursing students eligible for the LWA (about 26.7%) will persist under a Diploma Course system (such that, in 1982/83 prices, 'average' LWA for all Diploma Course students

Table 4 : Replacement Costs of RN Training Under Alternative Systems
(fp.a. 1982/83 prices)

Year	Replacement Grade	School of Nursing	Degree Course	Diploma Courses
1st	NA	3109	457	0
2nd	$\frac{1}{2}$ NS + $\frac{1}{2}$ EN	3464	1700	1540
3rd	EN	3819	1877	2546
4th	SN		2092	2091 ^[1]

[1] Degree Conversion Course. We assume the replacement costs of students on these courses to be equal to those of the 4th Year Degree Course Students.

works out as £194 p.a.). We adjust by 16% for overheads. Replacement costs for 1st, 2nd and 3rd Year Diploma students can then be estimated as: £0, £1540 and £2546, respectively (1982/83 prices). The 'replacement cost' of a 'Degree conversion course' student would be the same as for a 4th year Degree Course student i.e. £2092,

Table 4 summarizes our central estimates of the replacement costs of each year of student on School of Nursing, Degree and Diploma Courses.

It clearly illustrates the greater productive contribution made by School of Nursing Students in comparison with Degree and Diploma Course students. Even though Degree Courses stretch over an extra year, the productive contribution of students trained/educated on such courses is estimated to be under 60% of the value of the contribution of School of Nursing students, as judged by their estimated replacement costs. For Diploma Course students, the value of their total productive contribution during their 3 year courses is under 40% of that of School of Nursing students. Even if they proceed onto a 4th Year (i.e. Degree conversion course), their total productive contribution is still only worth around 60% of a School of Nursing student's.

The relevance of these results goes beyond their impact upon net costs of RN training under alternative systems. It indicates that a considerable number of NAs and ENs will have to be recruited by DHAs following transition to the proposed system to maintain nursing establishments. In fact, annual aggregate replacement costs under the proposed system are estimated to be around £109.5m (1982/83 prices) less than under the present system (see Section VII). Given that in 1982/83 the 'gross salary cost' of NAs and ENs were around £4663 and £5729, respectively, then we estimate that somewhere in the region of 21,000 extra ward staff (evenly divided between NAs and ENs) will be required in England as a whole to compensate for the reduction in student work contribution. Whilst spare manpower capacity of such a magnitude may exist in England as a whole, replacing the reduced work contribution of student nurses may provide difficulty in certain DHAs in particular due to shortages of supply and budget constraints. Where few ENs are readily available (and evidence suggests they are geographically immobile), SNs will have to be recruited - and this will inflate further the replacement costs associated with the closure of DHA Schools of Nursing.

SECTION VI

Central Estimates of Overall Exchequer Costs of RN Training Under Alternative Systems

1. Costs Per Registered Nurse

Having estimated annual costs per year of School of Nursing, Degree Course and Diploma Course students in 1982/83 prices under all 3 cost headings, these can be assimilated to produce estimates of the overall costs of training RNs under the alternative systems under analysis. Results are summarized in Tables 5-8.

Table 5 shows the central estimates of the component (and overall) costs per year of School of Nursing student in 1982/83 prices, as derived in the previous sections. To derive the total cost of successfully 'producing' or training an RN under this system we cannot simply sum the figures in the right-hand column of Table 5, since we must incorporate wastage. This is because those individuals who enter Schools of Nursing to undertake RN training but who do not successfully complete their course (either because they 'waste'/leave, or because they fail in the final examinations) will have brought costs to bear upon the State up until the point during the course that they leave, and these costs must therefore be spread over those students who do qualify as RNs under the School of Nursing system.

Unfortunately, up-to-date reliable cohort data on wastage and failure are not readily available. However, such evidence as there is suggests that, allowing for successful re-takes of exams, the overall wastage plus failure rate of cohorts of students in Schools of Nursing is around 20%, made up to 10% wastage and 10% examination failures. To incorporate wastage we assume - on the basis of evidence indicating tht most 'wasters' leave in their second year and fewest in their 3rd year - that this 10% leave (on average) half way through their 2nd year: in other words, mid-way through their course. The 10% examination failure rate allows for successful re-takes, and we naturally assume this occurs at the end of the final year. We also assume that the costs incurred during re-take years are negligible.

Table 5 : Central Estimates for the Annual Component and Overall Costs
For Each Year of School of Nursing Student, and Total Cost
Per School of Nursing RN (£ 1982/83 Prices) England

	(a)	(b)	(c)	(d)	(a)+(b)+(c)-(d)
Year	Formal Costs		Informal Costs	Replacement Costs	Overall Annual Cost
	Direct Teaching	Maintenance			
1st	980	4321	430	3109	2622
2nd	980	4494	430	3464	2440
3rd	980	4698	430	3819	2289
Total per RN[1]	3491	16023	1532	12296	8750

[1] Assumes 10% wastage rate (leaving mid-way through course); plus
10% examination failure rate (allowing for successful retakes).

Table 5 shows that, given this assumption concerning wastage and rounding to the nearest 50, the overall cost of training a RN under the School of Nursing system is around £8750 (1982/83 prices). The table also shows that easily the most significant components are gross salary costs and replacement costs. It would suggest that estimates will be particularly sensitive to the level of, and measurement of, the productive contribution of student nurses.

Table 6 illustrates the corresponding estimates for Degree Course students. Notice that in Table 6, central estimates are provided for overall costs under the assumption that student bursaries are real costs and valued at £1893 p.a. in 1982/83 prices. Notice also that on the basis of evidence from a number of Degree Courses wastage is assumed to be only 10%, with this 10% leaving, on average, at the end of their 1st year. Table 6 shows that, under the assumptions employed to produce our central estimates of components and concerning wastage, overall costs of RN training under the Degree Course system are estimated to be around £17,350, nearly double the corresponding cost per School of Nursing RN. (If bursaries were excluded total cost per Degree Course RN would fall to £9150, about 5% greater than the School of Nursing cost.) Clearly part of the work contribution of trainees under the existing system would have to be replaced: average replacement cost per Degree Course student per year works out as £1531.5 in comparison with a figure of £3464 for School of Nursing students.

Table 7 illustrates the corresponding information and central estimates for Diploma Course students. With these students, wastage behaviour is assumed to be the same as on Degree Courses now i.e. 10% leaving, on average, at the end of their 1st year. Our central estimates of the cost per RN under the Diploma Course system is about £10250 rounding to the nearest 50. This is around £1500 (17%) greater than the corresponding central estimate of the cost of training a RN in a School of Nursing. As with costs of RN training under the Degree Course system, assumptions about student bursaries are of crucial importance to the final estimate.

It is of interest to note the effect upon the average of Graduate Nurses which would occur were the productive contributions of 1st Year Diploma Course students raised from the assumed level of zero per cent to 10% (the same

Table 6 : Central Estimates for the Annual Component and Overall Costs for Each Year of Degree Course Student Course and Total Cost per Degree Course RN (£ 1982/83 Prices) England

	(a)	(b)	(c)	(d)	(a)+(b)+(c)-(d)
Year	Formal Costs	Informal Costs	Replacement Costs	Overall Annual Costs	
	Direct Teaching	Maintenance ^[1]			
1st	3625	1893	100	457	4768
2nd	3625	1893	100	1700	3525
3rd	3625	1893	100	1877	3348
4th	3625	1893	100	2092	3133
Total Per RN[2]	14903	8203	411	6177	17340

[1] Assumes level of bursary of £1893 p.a. (1982/83 prices) and that these are real costs.

[2] Assumed that 10% of entrants leave at the end of their 1st year.

Table 7 : Central Estimates for the Annual Component and Overall Costs
for Each Year of Diploma Course Student Course and Total Cost
Per Diploma Dource RN (£ 1982/83 prices) England

	(a)	(b)	(c)	(d)	(a)+(b)+(c)-(d)
Year	Formal Costs	Informal Costs	Replacement Costs[3]	Overall Annual Costs	
	Direct Teaching	Maintenance ^[1]			
1st	2500	1939	100	0	4100
2nd	2500	1939	100	1540	2560
3rd	2500	1939	100	2546	1554
Total Per RN[2]	7778	6248	311	4086	10251

[1] Assumes level of bursary of £1939 p.a. (1982/83 prices) and that these are real costs.

[2] Assumes that 10% of entrants leave at the end of their 1st year.

[3] Comparison with the corresponding figure for replacement cost per School of Nursing RN indicates that the latter are about £8210 greater; or £2737 per year per student.

as for Degree Course Students). The Replacement cost of a 1st Year Diploma Course student would be £466, which would raise overall Replacement cost per RN by approximately £518 (allowing for 10% wastage). Hence, cost per Diploma Course RN would be reduced by £518 (5%) to around £9750, only £1000 (11.4%) greater than our estimate for cost per School of Nursing RN.

Under both Degree Course and Diploma Course systems, the major component of overall costs will be the direct teaching costs of training/education. But, because of the lower formal costs as well as the shorter training periods, costs of RN training/education under the Diploma Course system are much less - perhaps only about 60% - of the corresponding costs under the Degree Course system. The two systems are perhaps best viewed as complements - both courses would run side-by-side - rather than substitutes. Under Degree and Diploma Courses the value of the productive contribution of students covers 75% and 65%, respectively, of the costs of their bursaries. Direct teaching costs account for around 85% and 75% of the total costs of RN training under Degree and Diploma courses, respectively, if we net replacement costs away from maintenance allowance costs. Under the School of Nursing system, direct teaching costs are much lower and account for around 40% of total costs.

Finally, Table 8 shows the overall cost of students who successfully complete the Diploma Course and then successfully take the Diploma-Degree conversion course. Estimates for costs here are simply the costs incurred under the Diploma Course system (see table 7), plus the costs of the 4th year of the Degree Course system (see table 6). The overall exchequer costs involved in a student qualifying under the Diploma Course system then converting fall somewhere between the estimated overall costs of RN training under the two higher education-based courses; around £13800.

2. Annual Aggregate Recurrent Costs

Annual aggregate recurrent costs are the total costs of RN training (net of students' productive contributions) made each hospital/financial year by the State. Their magnitude will obviously depend very much upon the total numbers of students studying to become RNs during any particular year. In terms of manpower planning, it makes more sense to think in terms of

Table 8 : Central Estimates for the Annual Components and Overall Costs for Each Year of Diploma-Degree Conversion Course Student and Total Cost per Diploma-Degree Conversion Course RN (£ 1982/83 prices). England

	(a)	(b)	(c)	(d)	(a)+(b)+(c)-(d)
Year	Formal Costs	Informal Costs	Replacement Costs	Overall Annual Costs	
	Direct Teaching	Maintenance ^[1]			
1st	2500	1939	100	0	4100
2nd	2500	1939	100	1540	2560
3rd	2500	1939	100	2546	1554
Conversion ^[2]	3625	1893	100	2092	3133
Total Per RN ^[3]	11403	8141	411	6178	13777

[1] Assumes level of bursary of £1939 during Diploma Course and £1893 during Conversion Course (1982/83 prices) and that these are real costs.

[2] Assumes costs of conversion course equal to costs of 4th year of Degree Course.

[3] Assumes 10% of entrants leave at the end of their 1st Year.

A required number of newly qualified RNs per year, rather than of total numbers of students. Given a reasonably steady and predictable rate of wastage during training, it is then simply a matter of calculating the required number of entrants necessary to meet that target.

At present, there are between 17,000 and 18,000 entrants to RN training under the School of Nursing system. We might assume, therefore, that with a wastage (plus failure) rate of around 20% the current 'target' number of newly qualified RNs is around 14,000 per year. On this basis, we estimate that the annual aggregate recurrent direct teaching costs of School of Nursing Courses to produce this number of newly qualified RNs to be about £49m. The total sum of gross salary costs will be in the region of £224m; bringing total annual aggregate 'formal' costs to around £273m per year (1982/83 prices). Informal costs are around £21.5m per year. Replacement costs are approximately 172m per year. Overall net annual aggregate recurrent costs under the School of Nursing system are about £122.5m (or £8.75m per 1000).

Under the proposed system the target number of newly qualified RNs will (initially, at least) remain at 14000 per year. If we assume that the wastage rate of both Degree and Diploma course students is about 10 per cent and that the mixture of qualifiers is 5 per cent straight Degree Course, 82.5 per cent Diploma Course and 12.5 per cent Diploma plus Degree conversion course then the annual aggregate recurrent direct tuition costs are about £120m. The informal costs sum to around £5m. The bill for the payment of bursaries would be about £92m p.a. The replacement cost of the time of the nurses under the new system would be around £62.5m. Overall net annual aggregate recurrent costs under the proposed system are estimated to be of the order of £154.5m (or £11m per 1000 RNs).

This is some £32m (26%) greater than the corresponding costs under the current system. The main extra cost arises therefore from the direct tuition cost. The tuition cost per student per year in Universities and Polytechnics is approaching four times that in Schools of Nursing. On the other hand, total formal costs that is actual outlays will be reduced because of the enormous reduction in the cost of training allowances from £224m per year to £92m per year. Overall aggregate formal costs will fall by 20-25% from

about £273m per year to £212m per year (1982/83 prices). Our analysis does suggest, though, that the new system may raise short-run problems in replacing the work output of trainees under the present system. The estimates presented above (and in Table 9) indicate, in fact, that the total annual aggregate value of replacement costs (our proxy for the value of students' productive contribution in the clinical area) will fall by about 60-65%. In other words, DHAs in England will have to spend around £110m per year (1982/83 prices) and employ around 21,000 extra ward staff (NAs and ENs) to 'replace' the reduced work contribution of students if the present proposals are implemented. On the other hand, the reduction in informal costs of around £16.5m would release the equivalent of about 2,500 ward staff (three-quarters SNs and one-quarter Ws/CNs) for productive work.

These final estimates for the annual aggregate recurrent costs of nurse training under the present and proposed system (assuming a target of 14,000 newly qualified RNs per year under each system) are shown in Table 9.

It should be noted that the estimated figures for annual costs per 1000 newly qualified RNs, as well as annual aggregate recurrent costs, under the proposed system depend upon a number of variables which are, as yet, undetermined in detail. For example, a 10% work contribution of Diploma Course Students in their 1st Year would lower costs per Diploma Course RN by over £500, and so reduce costs per 1000 RNs under the proposed system by around £0.5m (and hence, annual aggregate recurrent costs by £7m, given a target annual number of qualified RNs of 14,000). Omitting the Diploma-Degree Conversion course would save around £0.4m per 1000 RNs (£6m on annual aggregate recurrent costs) under the proposed system. Naturally, such Conversion courses would not have to be omitted totally - there could simply be a percentage reduction in the number of successful Diploma Course Students progressing onto them, which would save that percentage of £6m p.a.

Two further points are worth mentioning. Firstly, though Enrolled Nurses (ENs) would not be trained under the proposed system and this report set out to compare just the costs of RN training under the alternative systems, considerable costs are being incurred under the present system as a result of EN training. Using precisely the same methodology as used to generate estimates for RN training (with a 80% work contribution in both years, a wastage rate of 15% mid-way through their course, plus an examination/

Table 9 : Annual Aggregate Recurrent Costs of RN Training/Education
(£m, 1982/83 prices) England

	Present System	Proposed System ^[2]
Formal Costs: Direct Teaching Costs	49	120
Maintenance Allowances	224	92
	—	—
	273	212
Informal Costs	21.5	5
Replacement Costs	172	62.5
Net Overall Costs ^[1]	122.5	154.5
Net Overall Costs per 1000 RNs	8.75	11

[1] Assumes 14,000 newly qualified RNs per year under both systems.

[2] Assumes 5% of students undertake Degree Courses, 12.5% undertake Diploma Courses followed by Degree Conversion Courses, and 82.5% undertake just Diploma Courses.

assessment failure rate of 5%), costs per EN are estimated to be around £4000 over their 2 year course (1982/83 prices). Given an annual intake in England of around 7000 Pupil Nurses, and so a 'target' number of newly qualified ENs per year of between 5,000 and 6,000, annual aggregate recurrent costs of EN training are estimated to be of the order of £22m (1982/83 prices).

Finally, it should be stressed that should the required annual number of newly qualified RNs fall then the annual aggregate costs of RN training/education should fall more-or-less proportionately. If, for example, the required annual number of newly qualified RNs fell by 25% then (in real terms) the annual aggregate net costs of RN training/education will be below their current level under the existing system. Naturally, the opposite would occur should the required annual number of newly qualified RNs increase. An assessment of future nurse manpower requirements is outside the scope of this report.

SECTION VII

(a) Uncertainties with estimates

The estimates produced in this exercise have tended to indicate that the costs of RN training/education would rise by something like 26% - if and when the proposed transition in RN training/education from Schools of Nursing into higher education, with a switch from 'employee' to 'student' status, is realised. However, certain qualifications need to be re-iterated if they are not already very apparent.

i. Costs of Degree Course and Diploma Course systems will depend crucially upon judgements about student grants/bursaries. If these are regarded as real costs, perhaps because the government simply reduces DHSS/NHS budgets by the full amount of the total payment of these grants/bursaries, then costs under both Courses are much higher than if they are viewed purely as transfer payments.

ii. If grants/bursaries are regarded as costs, then the level of these bursaries will be a determinant of the costs of nurse training. If they are kept at a low level, this will hold down the exchequer costs of RN training (as illustrated in Table 9) but only at the expense of raising the new private costs of RN training. The individual will face the same opportunity cost in foregone earnings, but will get less compensation for it. The higher the level of opportunity/private costs, then the fewer well-qualified applicants for RN training there will be.

iii. Our estimate of direct teaching/tuition costs under Degree Courses are subject to a margin of error of perhaps $\pm 10\%$ (possibly even $\pm 15\%$). Estimates of the corresponding costs under Diploma Courses are even more subject to error because of uncertainty over details such as the staff:student ratio. It is clear from Table 9 that variations of $\pm 10\%$ in our central estimate for direct teaching costs under the proposed system would vary the estimated net overall aggregate costs of RN training/education by about $\pm 8\%$.

iv. It follows that policy on location of Diploma Course students, staff:student ratios on Diploma Courses, etc., will have very considerable effects upon the aggregate costs of RN training/education.

v. Our estimates have indicated the high sensitivity of final net aggregate costs to the productive contribution of students. For both cost and manpower reasons, it may or may not be practicable to reduce the level of this contribution by the degree indicated by the details of present proposals and the estimates of this paper (i.e. by almost £110m per year in cost of replacement staff).

(b) Short-run versus long-run costs.

In our view the most reasonable assumption is that the short-run costs of moving a small proportion of total students into the higher education sector in the first stage of the transition would be below the medium run average costs of the total programme i.e. moving all students into higher education. In the short-run there would be some spare capacity in colleges. But in the medium term it would be necessary to face the capital costs of a substantially increased number of students who would be on different sites and different areas of concentration from the existing Nurse Training Schools. There would also be costs involved in recruiting suitable staff and a substantial retraining programme would be required to help some of the existing staff in schools of nursing to transfer to the new setting. On the other hand, in the long-run, when the necessary medium-run transition costs (extra buildings, etc.) have been met, average costs might be expected to fall again.

(c) Phasing Problem

As a first stage it would be possible to visualise some sharing of courses and common use of facilities in those areas where there were no great geographical problems. In some towns where there is both a large polytechnic and a school of nursing it would be possible to bring about substantial integration fairly easily. There would be strong arguments in terms of educational quality for giving student nurses access to the broadly based science teaching and the wider range of courses available in Polytechnics.

If the bursary is nearer in value to the current Student Nurse training allowance than to the student grant and if the average costs of the new courses would be the same as those found for most Polytechnic courses,

the total cost would be higher. However it seems to us realistic on the basis of the experience of current degree courses that wastage would be rather lower. In assessing such calculations however it must be remembered that it is not possible to give a quantitative estimate of the higher quality -- yet in our opinion this is an important and real consideration.

The change presents many problems in adapting existing premises and retraining staff. It would also involve changes in the distribution of nurses in training as the location of training schools at present is not closely fitted to Polytechnics and Universities. However in the long run many of these problems would be overcome. Over a ten year period it would be feasible to make the change.

Ultimately, the programme would have to be justified as an investment in an enhancement of nursing education and quality of care. We have estimated that net annual aggregate recurrent costs may be £32m (26%) higher following transition (they may well be higher during transition). This extra expenditure may well be worthwhile if it brought significant returns in terms of quality of nursing care which, besides being desirable in itself, may well permit savings to be made in terms of a reduction in the total manpower requirement. Furthermore, if the programme resulted in a reduction in the wastage rate among qualified RNs, this would lower the required annual number of student nurse entrants and, consequently, the annual aggregate costs of RN training. We would stress the importance of an appraisal of these possibilities prior to any decisions concerning the programme being taken.

REFERENCES

1. K. Hartley and L. Goodwin: "The Exchequer Costs of Nurse Training in England". Centre for Health Economics, Discussion Paper, 1985.
2. E.R.D. Bendall, "The Costs of Basic Nurse Training in England", English National Board, 1983.
3. N.G. Reid, et al. "Aspects of Nurse Training in Northern Ireland", Centre for Applied Health Studies, New University of Ulster, June 1983.
4. N.G. Reid et al "Summary of Main Findings, Nurse Training Study", Centre for Applied Health Studies, New University of Ulster, November 1983.
5. DHSS "Background Information for the Review Body for Nursing and Midwifery Staff and Professions Allied to Medicine", November 1983.
6. C. Beckett, "Student Status in Nursing - a Discussion on the Status of the Student and How it Affects Training". Journal of Advanced Nursing, 1984, 9, 363-374.
7. L.K. Hardy, H. Sinclair, and J. Hughes, "Nursing Careers: findings of a follow-up survey of Graduates of the Nursing Education and Administration Certificate Courses of the Department of Nursing Studies, University of Edinburgh, 1958-1975". Journal of Advanced Nursing, 1984, 9, 611-618.
8. U.K.C.C. Working Group 3. "The Developments of Nursing Education". UKCC, 1982.
9. DHSS Operational Research Service, "Nurse Manpower: Maintaining the Balance". March 1982.
10. DHSS Operational Research Service, "Nurse Manpower; Planning; Approaches and Techniques". 1983.
11. RCN "Report of the Working Group on Education and Training". 1984.
12. Maplin Report. "The Collection and Use of Nurse Movement Information". Manpower Planning Series 7, 1983.
13. I.M.S. "Nurse Manpower Systems for S.W. Thames RHA". 1979.
14. R. Hutt, H. Connor, and W. Hirsh, "The Manpower Implications of Possible Changes in Basic Nurse Training". A Report for the RCN's Education Committee (Draft), 1984.
15. Department of Employment. "New Earnings Survey 1983".
16. H.M. Treasury, "The Government's Expenditure Plans, 1984-85 to 1986-87". Volume II, Cmnd. 9143 - II February 1984.
17. DES. "Statistics of educations, 1979, Vol. 5, Finance and Awards", HMSO, 1982.
18. The University Grants Committee. "A Strategy for Higher Education into the 1990's, The University Grants Committee's Advice". HMSO, September 1984.